

# UNDULANT FEVER IN THE NAVAL, MILITARY AND CIVILIAN POPULATIONS OF MALTA

BY

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In the previous paper Zammit has considered the prevalence of undulant fever\* in the goat in Malta. As complementary to that paper I thought it would be of interest to present afresh the data as to the prevalence of the fever in the Mediterranean Squadron, Army (Malta Garrison), and civilian population of Malta respectively previous to 1906, and from that time onwards so far as data are available. 1906 is the critical year in regard to the relationship of undulant fever and goats' milk, for it was mainly in the latter half of that year that orders affecting the use of goats' milk came into force.

I have prefaced each section of the paper by some remarks, with the object of elucidating the meaning of the figures presented; for it is difficult, in the case of many, if not all, vital statistics, to ascertain whether they really represent what they are supposed to do. In the present connection it is essential to know whether a case 'returned' as undulant fever is that fever or not. Undulant fever is among the select class of infections that can be diagnosed with certainty. It is probable not only that certainty has not been attained in many cases, but that the approach thereto is a variable one.

## NAVY

### MEDITERRANEAN SQUADRON

#### I. NOMENCLATURE :

The following terminology is used in the 'Statistical Reports of the Health of the Navy':—

*Other Continued Fevers* is used from 1900-1906 and signifies fevers other than enteric and Mediterranean, influenza appearing under its own heading.

*Pyrexia* replaces 'Other Continued Fevers' in the tables from 1907-1914.

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\* In the 'Nomenclature of Diseases,' Royal College of Physicians, London, 1897, 3rd Edition, appears the entry, *Mediterranean Fever*, synonym *Malta Fever*.

In 1918, 5th Edition, the entry, *Mediterranean Fever*, synonym *Undulant Fever* is used.

*Simple Continued Fever* is also used synonymously with Pyrexia in the text in 1909.

*Sand-fly Fever*. In the report for 1910, p. 50, it is stated that of the 98 cases of 'Pyrexia' in that year 58 were 'Sand-fly Fever.'

*Cerebro-spinal Fever* has a separate heading in 1912.

*Mediterranean Fever* is used in the tables from 1900-1906 and from 1910-1914.

*Malta Fever* is used in the tables and text from 1907-1909.

## 2. DIAGNOSIS :

1900. 'Agglutination adopted as a routine practice in the Army and shortly after in the Navy.'

(*Report of the Commission on Mediterranean Fever*, Pt. II, 1905, p. 12.)

## 3. GOATS' MILK :

### (a) N a v a l H o s p i t a l .

1906—April 9. 'More stringent measures taken at the Royal Naval Hospital for the sterilisation of goats' milk.'

1906—July 23. 'Preserved milk substituted for goats' milk.'

(*Statistical Report of the Health of the Navy*, 1906, p. 120.)

### (b) T h e F l e e t .

1906—May 23. 'The Commander-in-Chief promulgated a general memorandum to the effect that as a guarantee of sterilisation the ortol and peroxide of hydrogen test should be used in all ships.'

1906—Aug. 4. 'The Commander-in-Chief repeated the order that all milk obtained in Malta was to be boiled. It was then to be tested by the ortol test.'

(*Commission Report*, Pt. VII, 1907, pp. 72 and 73.)

## 4. ESTIMATED STRENGTH :

The figures for the *average strength* refer to the *Mediterranean Squadron* and not simply to Malta, so that the rate per 1,000 is not comparable with that of the garrison or civilian population of Malta. These figures are *corrected for time*, i.e., if 1,000 men have been in the Mediterranean Squadron for six months and 500 for one year, the average strength per annum is 1,000 : or again, if 365 men have been in the Squadron for one day and one man for 365 days, the average strength per annum is 2.

TABLE I

Showing prevalence of Undulant and certain other fevers in the Mediterranean Squadron, 1900-1914

Year	Average strength corrected for time	Cases		Rate per 1000 per annum	
		Mediterranean fever	Other continued fevers	Mediterranean fever	Other continued fevers
1900 ... ..	14250	317	351	22·2	24·6
1901 ... ..	14070	252	323	17·9	22·9
1902 ... ..	18470	354	433	19·1	23·4
1903 ... ..	18410	339	287	18·4	15·5
1904 ... ..	19590	333	401	17·0	20·4
1905 ... ..	14360	270	174	18·8	12·1
1906 ... ..	12130	145	99	11·9	8·1
			Pyrexia		Pyrexia
1907 ... ..	10530	14	110	1·3	10·4
1908 ... ..	9780	6	119	0·6	12·1
1909 ... ..	9920	11	69	1·1	6·9
1910 ... ..	9850	3	98	0·3	9·9
1911 ... ..	9770	5	144	0·5	14·7
1912 ... ..	7870	3	49	0·3	6·2
1913 ... ..	7580	2	38	0·2	5·0
1914 ... ..	10220	6	34	0·5	3·3

## ARMY

### MALTA GARRISON

#### I. NOMENCLATURE :

The following terminology is used in the Army Medical Department Reports :—

*Other Continued Fevers* is used in the statistical tables for the years 1897-1907.

*Simple Continued Fever* is used as one sub-division of ' Other Continued Fevers ' in the text from 1897-1907, the other sub-division being Mediterranean fever from 1897-1903, and Malta fever from 1904-1907.

*Pyrexia of Uncertain Origin* (P.U.O.) replaces 'Simple Continued Fever' in the statistical tables and in the text for the years 1908-1914.

*Sand-fly Fever* appears in the tables and text for 1910-1914.

*Mediterranean Fever* is used in the text from 1897-1903 and also from 1910-1914.

*Malta Fever* is used in the tables and text from 1904-1909.

## 2. DIAGNOSIS :

1900. 'Agglutination adopted as a routine practice in the Army and shortly after in the Navy.'

(*Commission Report*, Pt. II, 1905, p. 12.)

Major-General Sir William Leishman, K.C.B., F.R.S., has informed me that the diagnosis of undulant fever is always based on the agglutination reaction.

## 3. GOATS' MILK :

1905. It is stated that in 1905 'orders were issued by commanding officers that all goats' milk for the use of the men in barracks was to be boiled.'

(*Commission Report*, Pt. VII, p. 168.)

1905—September. The attention of officers commanding was called to the fact that 'in some corps goats' milk had not been boiled before use' (p. 169).

1906—May 16. The ortol test for detecting unboiled milk was in use and 'during the next three weeks neglect of boiling goats' milk was detected on six separate occasions' (p. 170).

1906—May 12. 'Orders were issued for the discontinuance of the use of goats' milk in the military hospitals as a tentative measure, and for its replacement by condensed milk.'

'This change came into operation in the various hospitals between May 18 and 22, and at the same time the use of goats' milk by the various detachments of the Royal Army Medical Corps also ceased' (p. 172).

1906—June. 'By the end of the first week in June all the units of the garrison were using condensed milk, with the single exception of the 1st Battalion Rifle Brigade, which continued to use goats' milk up to October' (p. 173).

TABLE II

Showing prevalence of Undulant and certain other fevers in the Malta Garrison, 1897-1914

Year	Average strength	Cases		Rate per 1000 per annum Mediterranean fever
		Mediterranean fever	Simple continued fever	
1897 ... ..	8023	279	1275	34.7
1898 ... ..	7390	199	1510	27.1
1899 ... ..	7425	275	1107	37.0
1900 ... ..	8140	158	1158	19.4
1901 ... ..	8136	253	1205	31.1
1902 ... ..	8758	155	1029	17.7
1903 ... ..	8903	404	786	45.4
			Other continued fevers	
1904 ... ..	9102	320	1350	35.1
1905 ... ..	8294	643	1199	77.5
1906 ... ..	6661	161	508	24.1
1907 ... ..	5700	11	323	1.9
			Pyrexia of uncertain origin	
1908 ... ..	6030	5	303	0.82
1909 ... ..	6392	1	285	0.15
			Sand-fly fever	
1910 ... ..	6769	0	26 124	0.0
1911 ... ..	6686	0	14 125	0.0
1912 ... ..	6593	3	5 104	0.45
1913 ... ..	6336	3	25 72	0.47
1914 (7 months only)	3487	1	0 51	0.28

## CIVILIAN POPULATION OF MALTA

### I. NOMENCLATURE :

' All fevers lasting more than a week are notifiable by law.'

' Mediterranean fever is generally notified under the name of remittent fever.'

(*Commission Reports*, Pt. II, 1905, p. 15.)

It appears from the above Report that in the civil official notification returns, cases notified under the name ' continuous fever ' are included in the Annual Public Health Reports under heading ' Mediterranean fever.'

We find the following terminology employed in the Public Health Reports :

*Remittent Fever* is used (for Mediterranean fever) in the Reports for 1897 and 1902-03.

*Continued Fever*, in addition to remittent fever, or Mediterranean fever, is used in the Reports for 1897, 1906-07, and (apparently synonymously with febricula) 1907-08, and then disappears.

*Febricula*, in addition to remittent, or Mediterranean, fever, is used in the Reports from 1898 to 1906-07 and then disappears. The number of cases for the five years, 1902-03 to 1906-07, was 66, 35, 26, 22, and 42 respectively.

*Undulant Fever* (for Mediterranean fever) first appears in the Report for 1912-13.

The terms ' Simple continued fever,' ' Pyrexia of uncertain origin,' and ' Sand-fly fever ' do not appear in any of the reports.

### 2. DIAGNOSIS :

That the agglutination test is in use for purposes of diagnosis appears from the Public Health Reports, for in the Report for 1912-13, p. 30, it is stated that ' 636 samples of blood were submitted by private medical practitioners for the agglutination test of cases of fever.'

### 3. GOATS' MILK :

1907-08. The use of boiled goats' milk adopted in the Central General Hospital.

(*Annual Report, Public Health Department*, 1908-09, p. 5.)

1909—June. Regulations were issued apparently at this time requiring that all milk sold in shops, restaurants, etc., be boiled, but it appears from the Public Health Reports (1911-12, p. 43) that ' it is very seldom that the law is complied with.'

TABLE III

Table showing prevalence of Undulant fever and Febricula in the civilian population of Malta, 1902-03 to 1919-20.

Year	Population	Cases		Rate per 1000 per annum Undulant fever
		Undulant fever	Febricula	
1902-3 ... ..	193,315	589	66	3.0
1903-4 ... ..	197,070	573	35	2.9
1904-5 ... ..	202,134	663	26	3.3
1905-6 ... ..	205,059	822	22	4.0
1906-7 ... ..	206,689	714	42	3.4
1907-8 ... ..	209,974	501	6*	2.7
1908-9 ... ..	212,888	463	...	2.1
1909-10 ... ..	215,879	463	...	2.1
1910-11 ... ..	213,395	297	...	1.7
1911-12 ... ..	215,332	275	...	1.2
1912-13 ... ..	216,617	370	...	1.7
1913-14 ... ..	216,879	338	...	1.5
1914-15 ... ..	218,542	321	...	1.4
1915-16 ... ..	220,968	473	...	2.1
1916-17 ... ..	223,741	495	...	2.2
1917-18 ... ..	224,326	429	...	1.8
1918-19 ... ..	224,655	363	...	1.6
1919-20 ... ..	224,859	619	...	2.7

\* 'Continued fever.'

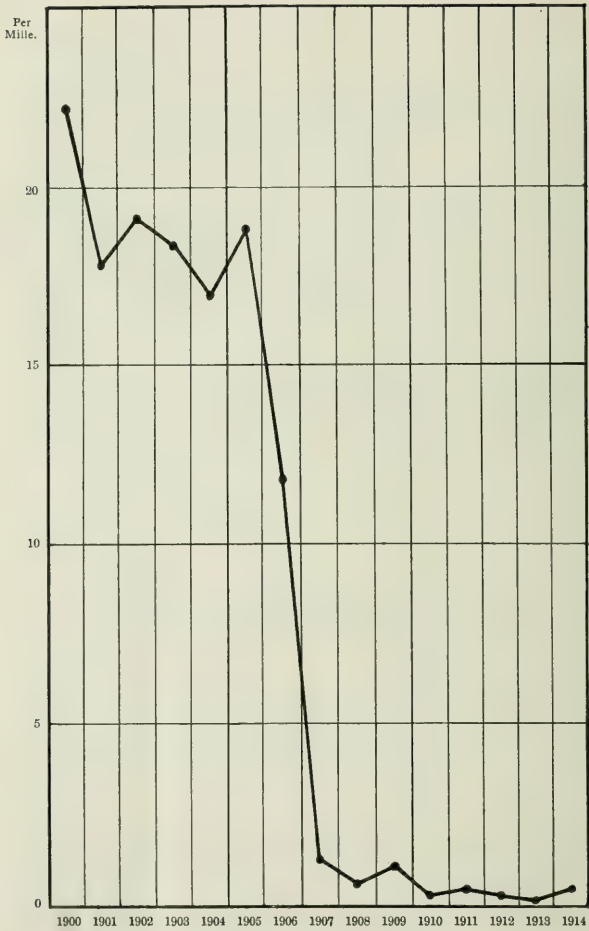


CHART I. Showing incidence of Undulant Fever in the Mediterranean Squadron.

N.B.—One division of this scale represents 5 per 1000.



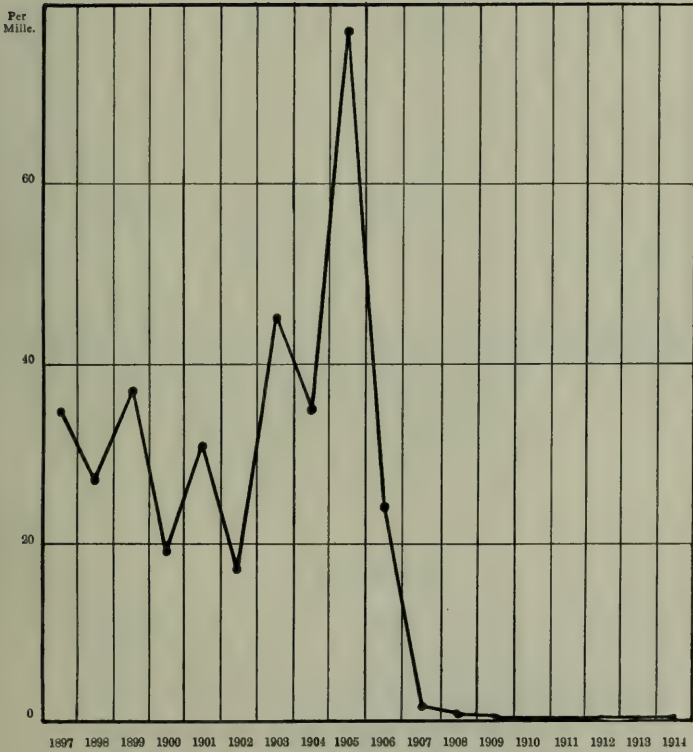


CHART II. Showing incidence of Undulant Fever in the Malta Garrison.

N.B.—One division of this scale represents 20 per 1,000.

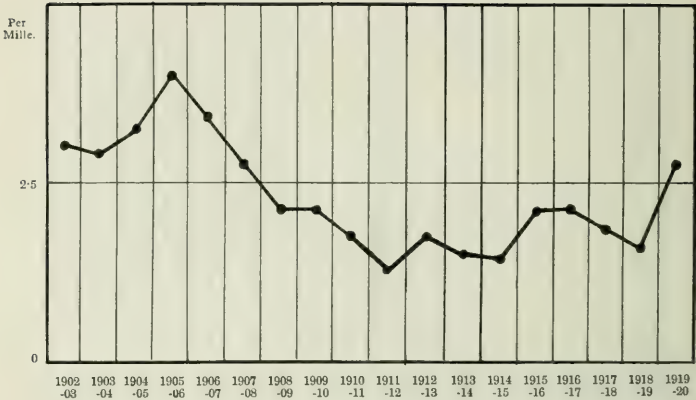


CHART III. Showing incidence of Undulant Fever in the Civil Population of Malta.  
N.B.—One division of this scale represents 2.5 per 1,000.

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